

## **REMARKS**

Reconsideration of the present application, as amended is respectfully requested.

### **I. STATUS OF THE CLAIMS**

Claims 1-33 are pending in the present application. Claims 1, 13, 24 and 29 have been amended to further clarify that the blended material is irradiated with an e-beam to form the underlayer of the bi-layer resist. New claims 34 and 35 has been added. Claims 6, 7-9, 17 and 18-20 have been canceled herewith, without prejudice.

Support for the above amendments to claim 1, 13, 24 and 29 and new claims 34 and 35 can be found throughout the specification, as originally filed. No new matter has been added by virtue of this amendment.

### **II. Rejection Under 35 U.S.C. § 102:**

Claims 1, 5, 6, 11-17 and 22-33 were rejected under 35 U.S.C. § 102(b) as being anticipated by US Patent No. 6,054,248 to Foster et al. ("the Foster patent").

As noted above, claims 1, 13, 24 and 29 have been amended to further clarify that the blended material is irradiated with an e-beam to form the underlayer of the bi-layer resist.

In response, Applicants respectfully assert that Foster fails to teach or suggest all of the features recited in method claims 1, 13, 24, and 29 of the presently claimed invention.

In particular, Foster fails at the very least to teach or suggest irradiating a blended material with an e-beam to form an underlayer of a bi-layer resist as recited in method claims 1, 13, 24 and 29 of the presently claimed invention.

The Examiner notes on page 11 of the current Office Action that Foster teaches that material may be irradiated by a laser beam to thermally cure the material. However, it is respectfully asserted that what Foster describes is that laser beams, X-rays, UV light, or e-beams may be applied to a radiation sensitive resist top layer coat of a bi-layer resist system for patterning an image on the radiation sensitive top layer. There is no teaching or suggestion in Foster, however, of using the e-beam to form an underlayer of the bilayer resist system by irradiating blended materials with the e-beam, as recited in claims 1, 13, 24 and 29. In other words, the e-beam described in Foster has no role in the formation of its underlayer, but rather the underlayer of its bi-layer resist is formed prior to use of the e-beam via use of heat or UV rays. Foster only discloses using an e-beam, as discussed, for patterning an image in the top coat layer of its resist. (See Column 7, lines 35-49 of Foster)

For the reasons set forth above, applicants respectfully submit that Foster fails to anticipate applicants' claims 1, 13, 24 and 29. Therefore, withdrawal of the rejections to independent claims 1, 13, 24 and 29 is respectfully requested. Since, claims 5, 11 and 12 depend from and incorporate all of the limitations of claim 1 and claims 14-16, 22 and 23 depend from and incorporate all of the limitations of claim 13, and claims 25-28 depend from and incorporate all of the limitations of claim 24, and claims 30-33 depend from and incorporate all of the limitations of claim 29, applicants respectfully submit that rejection to these dependent claims likewise be withdrawn.

### **III. Rejections Under 35 U.S.C. § 103:**

(i) **Claims 2-4 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Foster in view of US Patent No. 6,146,793 to Schaedeli et al ("the Schaedeli patent").**

As discussed above, Foster fails to teach or suggest all of the features recited in claim 1 of the presently claimed invention. Applicants submit that Schaedeli fails to cure the deficiencies of Foster.

In particular, as with Foster, Schaedeli likewise at the very least fails to teach or suggest irradiating a blended material with an e-beam to form an underlayer of a bi-layer resist as recited in method claim 1 of the presently claimed invention. Clearly, Schaedeli as with Foster, does not teach or suggest using an e-beam to form the underlayer for its bi-layer resist. Rather, in Schaeldeli, the irradiating source, e.g. laser beam is used only for patterning an image on the photosensitive top layer, but not for forming the underlayer of a bilayer resist, as recited in claim 1. Thus, the combination of Foster with Schaedeli fails to teach or suggest all of the features recited in claim 1. Therefore, claim 1 is patentable over the combination of Foster and Schaedeli.

Since claims 2-4 depend from and incorporate all of the limitations of claim 1, withdrawal of the rejection to these dependent claims is respectfully requested.

**(ii) Claims 6-10 and 17-21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Foster in view of US Patent No. 6,319,655 to Wong et al ("the Wong patent").**

As discussed above, Foster fails to teach or suggest all of the features recited in claims 1 and 13 of the presently claimed invention. Applicants submit that Wong fails to cure the deficiencies of Foster.

In particular, as with Foster, Wong likewise at the very least fails to teach or suggest irradiating a blended material with an e-beam to form an underlayer of a bi-layer resist as recited in method claims 1 and 13 of the presently claimed invention. Wong describes the steps of coating a photosensitive material (photoresist) imagewise, patterning the photoresist using deep UV rays (comprising a developing process which eliminates a non-image area), and enhancing etch resistance of the photoresistive composition by irradiating the patterned photoresist with an e-beam. As mentioned, above, Wong only teaches using e-beams to irradiate a patterned photoresistive layer for enhancing the etch resistance of the photosensitive layer, but fails to teach using e-beams for forming an underlayer of a bi-layer resist, as recited in claims 1, and 13. In fact, Wong does not even teach using an underlayer as part of its photoresist system, let alone forming an underlayer in the manner recited in claims 1 and 13.

Thus, the combination of Foster with Wong fails to teach or suggest all of the features recited in claims 1 and 13. Therefore, claims 1 and 13 are patentable over the combination of Foster Wong.

For the reasons set forth above, withdrawal of the rejection to claims 1 and 13 is respectfully requested. Since claim 10 depends from and incorporates all of the limitations of claim 1 and claim 21 depends from and incorporates all of the limitations of claim 13, withdrawal of the rejection to these dependent claims is likewise respectfully requested.

#### IV. NEW CLAIMS

Lastly, Applicants also respectfully assert that new claims 34 and 35 are each patentable over Foster, Schaedeli and Wong, alone or in combination.

First with regard to new claim 34, Foster, Schaedeli and Wong each at the very least fail to teach or suggest a method of forming an underlayer of a bi-layer resist film, wherein a naphthalene polymer and a methacrylate polymer are blended together to form a blending material, as recited in this claim.

Next with regard to new claim 35, this claim is patentable over Foster, Schaedeli and/or Wong for the same reasons as set forth with regard to claims 1, 13, 24 and 29. Specifically, as set forth above, the prior art of record at the very least fails to teach or suggest irradiating a blended material with an e-beam to form an underlayer of a bi-layer resist.

Moreover, new claim 35 is even further distinguished from the above cited prior art of record because Foster Schaedeli and/or Wong each also fail to teach or suggest irradiating a blended material, comprising a polymer having an aromatic group and a methacrylate polymer

on a substrate with an e-beam to cause the methacrylate polymer of the blended material to become cross-linked, thereby forming an underlayer, as recited in this new claim.

Although Foster describes a cross-linking agent and cross-linking reaction occurring in its undercoat layer, Foster fails to teach or suggest using an e-beam to cause its cross-linking reaction, as required by claim 35. Instead, Foster describes heating or applying UV rays to its composition in order to initiate its cross-linking reaction. Moreover, Foster also fails to teach or suggest a cross-linking reaction involving the cross-linking of a methacrylate polymer of a blended material comprising the methacrylate polymer and a polymer having an aromatic group. Rather, Foster only describes a cross-linking reaction occurring in an aromatic, aliphatic or cycloaliphatic substituted isocyanate cross-linking agent. There is no teaching or suggestion, however, of a methacrylate polymer becoming cross-linked in Foster.

Second, Schaedeli fails to teach or suggest any cross-linking reactions for forming its undercoat layer, let alone the cross-linking of a methacrylate polymer of a blended material, in forming an underlayer of a bilayer resist as recited in claim 35.

Lastly, Wong likewise fails to teach or suggest any cross-linking reactions for forming an undercoat layer, let alone the cross-linking of a methacrylate polymer of a blended material, in forming an underlayer of a bilayer resist as recited in claim 35. Further, as set forth above, Wong does not even teach the formation of a undercoat layer, let alone in the manner recited in claim 35.

Thus, new claims 34 and 35 are each patentable over Foster, Schaedeli and Wong, alone or in combination.

## **V. Conclusion:**

For the foregoing reasons, the present application, including claims 1-5, 10-16 and 21-34, is believed to be in condition for allowance. The Examiner's early and favorable action is

respectfully requested. The Examiner is invited to contact the undersigned if he has any questions or comments in this matter.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Scott L. Appelbaum", written over a horizontal line.

Scott L. Appelbaum

Reg. No. 41,587

Attorney for Applicants

F. Chau & Associates, LLC  
130 Woodbury Road  
Woodbury, NY 11797  
Tel: (516) 692-8888  
Fax: (516) 692-8889